REMARKS

Claims 1, 2, 4-14, and 16-24 are pending in the application.

Claims 1, 2, 4-14, and 16-24 have been rejected.

Rejection of Claims under 35 U.S.C. § 103

Claims 1-2, 4-14, and 16-24 stand rejected under 35 U.S.C. §103(a) as purportedly being unpatentable over U.S. Patent No. 6,405,284 issued to Bridge ("Bridge"), U.S. Patent No. 5,819,310 issued to Vishlitzky et al. ("Vishlitzky") and U.S. Patent Application No. 2003/0074528 issued to Soejima et al. ("Soejima"). Applicants respectfully traverse these rejections.

In order for a claim to be rendered invalid under 35 U.S.C. §103, the subject matter of the claim as a whole would have to be obvious to a person of ordinary skill in the art at the time the invention was made. *See* 35 U.S.C. §103(a). This requires: (1) the reference(s) must teach or suggest all of the claim limitations; (2) there must be some teaching, suggestion or motivation to combine references either in the references themselves or in the knowledge of the art; and (3) there must be a reasonable expectation of success. *See* MPEP 2143; MPEP 2143.03; *In re Rouffet*, 149 F.3d 1350, 1355-56 (Fed. Cir. 1998).

Independent claims 1 and 13, each contain limitations of substantially the following form:

> in response to a request to perform a plurality of operations on a plurality of
> logical volumes,
>
> > <u>identifying</u> a first storage region of a plurality of storage regions available
> > for allocation for a first operation of the plurality of operations on a
> > first logical volume of the plurality of logical volumes,

determining whether each of the remaining operations of the plurality of
operations can be performed on the remaining volumes of the
plurality of logical volumes using one or more subsets of the
plurality of storage regions, wherein

the one or more subsets exclude the identified first storage region,
and

allocating the first storage region for the first operation, after performing
said identifying and said determining, if said determining
determines that each of the remaining operations can be performed.

See, e.g., claim 1 (emphasis added). Applicants respectfully submit that neither Bridge nor

Vishlitzky nor Soejima, alone or in combination, provide disclosure of these limitations.

In the previous Office Action Response, dated 7/14/2008, Applicants submitted

amendments to independent claims 1 and 13 clarifying that the "identifying" and "determining"

limitations occur prior to the "allocating" limitation. Applicants further submitted that the

"allocating" limitation only occurs if the "determining" limitation determines that each of the

remaining operations can be performed.

In response to these points, the current Office Action notes that:

the features upon which applicant relies (i.e. that the claimed allocating *only*
occurs if the determining limitation determines that each of the remaining
operations can be performed …) are not recited in the rejected claim(s).

Office Action, p.7, ¶ 19 (emphasis in original). Given that the Office Action does not raise any

objections to the substantive distinctions submitted by Applicants, the above comment appears to

indicate that if it were the case that the "allocating" step only occurs if the "determining"

limitation determines that each of the remaining operations can be performed, then these claims

would be distinguished from the cited references.

Applicants respectfully submit that the conditional structure of the "allocating" limitation

provides that the claimed allocating of the first storage region only occurs if the claimed

"determining" limitation "determines that each of the remaining operations can be performed." The reason for this interpretation is that the only "allocating" limitation recited within the entirety of claims 1 and 13 is conditioned on the outcome of the "determining" limitation. Any other interpretation would be introducing limitations into these claims by reading alternatives into the claimed conditional language where none are present.

For the above reasons, and those discussed in the previous Response, Applicants submit that claims 1 and 13, and all claims depending therefrom, are in condition for allowance. Therefore, Applicants respectfully request the Examiner's reconsideration and withdrawal of the rejections to these claims and an indication of the allowability of same.

Applicants also submit two further points: (1) that no permissible combination of the cited references teaches or contemplates a determination of whether each of the remaining operations of the plurality of operations can be performed on the remaining volumes of the plurality of logical volumes using one or more subsets of the plurality of storage regions; and (2) that the cited references are not properly combinable.

The Cited Art Fails to Teach or Contemplate a Determination Using One or More Subsets of a Plurality of Storage Regions

Independent claims 1 and 13 each contain substantially the following limitations:

> determining whether each of the remaining operations of the plurality of operations can be performed on the remaining volumes of the plurality of logical volumes using one or more subsets of the plurality of storage regions, wherein
> the one or more subsets exclude the identified first storage region.

See, e.g., claim 1 (emphasis added). The Office Action cites to Bridge and Vishlitzky as purported disclosure of this limitation. *See* Office Action, p.3, (citing Bridge, Fig. 11, item 1106;

Bridge, 1:35-51; Bridge, 19:24-65; Vishlitzky, Fig. 1; Vishlitzky, 6:25-40). Vishlitzky is cited only for the proposition of considering multiple volumes and Applicants submit that the cited sections of Vishlitzky fail to provide support of one or more subsets of the plurality of storage regions and so it is not considered further in this regard. As for Bridge, the Office Action purports that the cited sections disclose a determination using one or more subsets of the plurality of storage regions. Applicants respectfully submit that Bridge does not consider one or more subsets of the plurality of storage regions because no consideration of subsets is ever made.

The first cited passage of Bridge is Figure 11, item 1106, which is a decision diamond in a flow graph labeled "Find sufficient full mirror partners?" The decisions results from item 1106 are "Yes" and "No". There is no suggestion that this decision diamond makes a consideration of anything analogous to one or more subsets of anything. The decision is purportedly based entirely on whether there are enough full mirror partners available. Thus, this cited passage of Bridge cannot be said to teach or contemplate the "determining" limitation of independent claims 1 and 13 which considers one or more subsets of the plurality of storage regions.

The second cited passage of Bridge notes that "[t]he logical volume manager divides a physical disk drive into one or more partitions." Bridge, 1:41-42. This description in Bridge is not relevant to a determination of whether each of the remaining operations of the plurality of operations can be performed on the remaining volumes of the plurality of logical volumes using one or more subsets of the plurality of storage regions. This description in Bridge does nothing more than purportedly provide the underlying physical arrangement of physical memory that Bridge's allocation method later utilizes. This description does not provide a mechanism in which the determinations are made in Bridge's allocation method. Thus, this cited passage of Bridge cannot be said to teach or contemplate the "determining" limitation of independent claims 1 and 13 which considers one or more subsets of the plurality of storage regions.

The third cited passage of Bridge describes a method for the purported allocation of a parity extent set. Bridge presents three steps: (1) finding a disk drive for the primary extent and allocating the primary extent; (2) allocating data extents if sufficient full mirror partners can be found, otherwise deallocating the primary extent and returning to step 1; and (3) storing information relating to mirror partners, logical volume number, extent type, and logical volume offset in allocation tables of the extents that were allocated. *See* Bridge, 19:40-57. There are essentially two steps in Bridge's method that pertain to allocation, first allocate the primary extent and then determine if there are enough full mirror partners to allocate the remaining extents. The determination of whether the remaining allocations can be made depends on one thing: finding enough available full mirror partners. This is a simple, binary determination dependent on the number of full mirror partners available. This determination in Bridge does not consider one or more subsets of the plurality of storage regions because the determination is based on the number of full mirror partners available – there is no suggestion or contemplation in the cited passages of Bridge that anything less that all full mirror partners available will ever be considered. Because the method in Bridge only considers the total number of full mirror partners available, it cannot be said that anything less than the total number of full mirror partners is considered. Thus, this cited passage of Bridge cannot be said to teach or contemplate the "determining" limitation of independent claims 1 and 13 which considers one or more subsets of the plurality of storage regions.

For at least these reasons, Applicants submit that neither Bridge nor Vishlitzky, alone or in combination, provide disclosure of the "determining" limitation of independent claims 1 and 13 which considers one or more subsets of the plurality of storage regions.

Application No.: 10/767,399

The Cited References are Not Properly Combinable

In the Office Action Response, dated 7/14/2008, Applicants submitted remarks explaining that a combination of Bridge and Soejima would render one of the references inoperative and that Vishlitzky is not cited for any proposition related to the combinability of Bridge and Soejima. Applicants further submit that it is not possible to transfer the teachings of Soejima to Bridge to cure the defect that the Office Action has identified in Bridge: that Bridge fails to perform a "determination" before "allocating." *See* Office Action, p.3.

In response to the previously submitted remarks that the combination of Bridge and Soejima would render one of the references inoperable, the Office Action notes that:

> In response to applicant's argument that incorporating Soejima into Bridge would allegedly render Bridge inoperative, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Office Action, pp.8-9, ¶ 22. This Office Action comment is from MPEP 2145, section III, but the Office Action does not provide a complete quotation to the MPEP section. A full quotation establishes Applicants' previously submitted proposition that Bridge and Soejima are not properly combinable:

> "The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). See also *In re Sneed*, 710 F.2d 1544, 1550, 218 USPQ 385, 389 (Fed. Cir. 1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); and *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973) ("Combining the teachings of references does not involve an ability to combine their specific structures.").

> **However, the claimed combination cannot change the principle of operation of the primary reference or render the reference inoperable for its intended purpose.** See MPEP § 2143.01.

MPEP 2145, section III (emphasis added). Applicants respectfully submit that Bridge and Soejima are not combinable because such a combination would render one of the references inoperable.

Applicants respectfully submit that the cited sections of Soejima cannot be combined with Bridge to achieve the current claims. The Office Action cites to Soejima as purportedly teaching "allocating the first storage region for the first operation if said determining determines that each of the remaining requirements can be satisfied." Office Action, p.4. One would not be motivated to combine Soejima with Bridge because the cited section of Bridge requires the allocation of the primary parity extent before performing the disclosed determination of space on the full mirror partners. To combine Bridge with any reference that purportedly does not also require such allocation would be contrary to the teachings of Bridge and would render the system taught by Bridge inoperable. It is impermissible to combine references under 35 U.S.C. § 103 when such a combination would render one of the references inoperable.

Even were it permissible to combine the teachings of Bridge with those of Soejima, Soejima is not designed to avoid the issues raised by the teachings of Bridge because the teachings of Soejima relate to a different, and unrelated, problem from those of Bridge. Bridge relates to purportedly finding mirror extent space. Soejima, on the other hand, relates to making sure that performance of other, pre-existing data volumes is not adversely affected by creation of an additional volume. *See, e.g.*, Soejima ¶¶ [0015]-[0016]. Soejima finds space for the additional volume and then determines whether performance of other volumes is affected. Soejima is not concerned with mirrors (as discussed in Bridge) or other operations to be performed (as

discussed in the present Application). Further, the section of Soejima cited for the claimed identification only relates to the one volume Soejima is purportedly creating and not to all other operations, as claimed. Therefore, Soejima fails to provide the missing disclosure for which it is cited.

Applicants submit even if the Bridge and Soejima references were somehow combinable without rendering one of the references inoperative, the combined teachings would not disclose all of the limitations recited within independent claims 1 and 13. In particular, because the cited passages of Soejima only perform one allocation operation at a time, there is no way a person of ordinary skill in the art could extract from Soejima's method a method that would be applicable to performing a plurality of operations at a time. Given only the cited passages of Soejima, a person of ordinary skill in the art could only guess at what could be done if Soejima's system were presented with a plurality of operations to be performed. Without contemplating a plurality of operations, Soejima cannot be said to teach anything like the claimed "determination whether each of the remaining operations of the plurality of operations can be performed." Given that Soejima does not teach or contemplate anything analogous to the claimed "determining" limitation, Soejima's addition to Bridge does nothing to compensate for Bridge's lack of teaching of the "determining" limitation.

The cited passages of Soejima are directed to allocation of <u>one single volume</u>, and this allocation is <u>one single operation</u>. Claims 1 and 13 are performed in response to "a request to perform a plurality of operations on a plurality of logical volumes." There is no plurality of operations disclosed in the cited sections of Soejima, and no determination of whether a plurality of operations can be performed. The other volumes in Soejima are relevant only insofar as their prior allocations purportedly provide an environment in which the present single allocation must find a suitable assignment. Applicants respectfully submit that the single determination and

allocation in Soejima would provide no teaching to one having ordinary skill in the art in modifying the method in Bridge which involves a process describing how a <u>group</u> of extents should be allocated. This lack of teaching stems from the fact that there is no methodology or pattern to be extracted from a single allocation. Applicants submit that without some contemplation of multiple allocations, a method to satisfy multiple allocations can not be divined.

> Further, the Office Action notes that:

> By changing the order of steps of the allocation of Bridge (fig. 11) to reflect Soejima's allocating the first storage region for the first operation after identifying a storage region and determining that each of the **remaining requirements** can be satisfied (fig. 4; paragraph 43-44), the improved load balancing, reduction or elimination of fragmentation, and efficient incremental addition of disk drives as intended by Bridge would still occur.

Office Action, p.9, ¶ 22.a (emphasis added). This statement analogizes "remaining requirements" to further operations. Applicants respectfully submit that this analogy does not hold. The "remaining requirements" considered in Soejima pertain to consideration of requested performance of all related other volumes. *See* Soejima, ¶ [0016]. Because Soejima's method of allocating a single volume provides no teaching or contemplation of the allocation of multiple volumes, one of ordinary skill in the art would have no way to apply the teachings of Soejima to Bridge. Thus, Soejima cannot be said to teach or contemplate the determining whether each of the remaining operations of the plurality of operations can be performed on the remaining volumes of the plurality of logical volumes. Because Soejima cannot be said to teach or contemplate an analogous "determining" limitation, Soejima cannot be said to teach an allocation only after the claimed "determining" is performed. Therefore, a teaching of "determining" before "allocation" cannot be transferred from Soejima to Bridge in order to expand the scope of Bridge. Because Bridge alone is insufficient (as noted by the Office Action

on page 3), and the addition of Soejima does not cure the failure of Bridge to teach the "determining" limitation before the "allocating" limitation of independent claims 1 and 13, it cannot be said that the combination of Bridge and Soejima teach or contemplate all the limitations of claims 1 and 13.
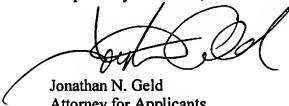
For at least these reasons, Applicants submit that neither Bridge nor Vishlitzky nor Soejima, alone or in combination, provide disclosure of all the limitations of independent claims 1 and 13, and dependent claims 2, 4-12, 14, and 16-24, and that these claims are in condition for allowance. Applicants therefore respectfully request the Examiner's reconsideration and withdrawal of the rejections to these claims and an indication of the allowability of same.

CONCLUSION

Applicants submit that all claims are now in condition for allowance, and an early notice to that effect is earnestly solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is requested to telephone the undersigned.

If any extensions of time under 37 C.F.R. § 1.136(a) are required in order for this submission to be considered timely, Applicants hereby petition for such extensions. Applicants also hereby authorize that any fees due for such extensions or any other fee associated with this submission, as specified in 37 C.F.R. § 1.16 or § 1.17, be charged to Deposit Account 502306.

Respectfully submitted,

Jonathan N. Geld
Attorney for Applicants
Reg. No. 44,702
Telephone: (512) 439-5090
Facsimile: (512) 439-5099